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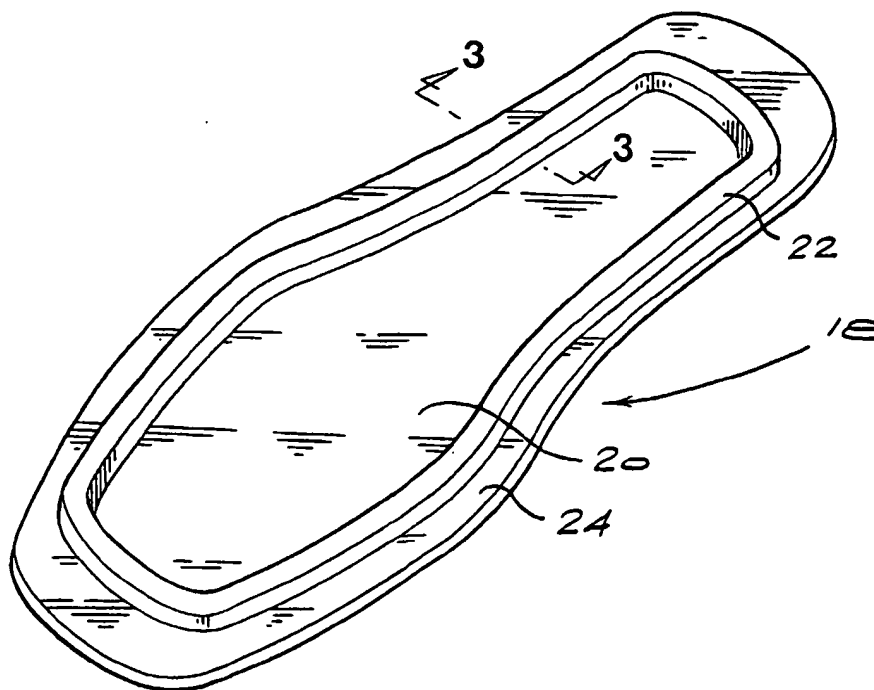
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(54) Title: **SHOE SOLE MANUFACTURING METHOD AND PRODUCT**



(57) Abstract: The invention concerns a method of manufacturing a randed shoe sole or midsole. In the method, a one piece article (18) consisting of a heelless sole or midsole caster (20) with randing (22) on is produced by a single moulding step. The caster (20) is relative to the randing (22) and is subsequently trimmed to suit the randing.

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## **"SHOE SOLE MANUFACTURING METHOD AND PRODUCT"**

### **BACKGROUND TO THE INVENTION**

THIS invention relates to a shoe sole manufacturing method and product.

In a randed shoe sole, decorative randing is attached to the periphery of a preformed sole. In the case of welted shoes this is achieved by stitching. In other cases the normal practice is to glue the randing manually, or by machine, to the periphery of the sole. In the latter case the sole is typically cut from a sheet of resin rubber termed "bovinide". The cut sole is substantially on a size for size basis, i.e. it has substantially the same shape and size as the final sole of the shoe, although there may be a small trimming allowance which is trimmed off after the randing is fixed in place.

Particularly in the case of manual application the fixing of the randing to the sole is time consuming and may contribute substantially to the overall cost of the shoe.

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### **SUMMARY OF THE INVENTION**

According to a first aspect of the invention there is provided a method of manufacturing a randed shoe sole or midsole wherein a one piece article comprising a heelless sole or midsole caster with randing thereon is produced by a single moulding step, the caster being oversize relative to the randing, and the caster is then trimmed to suit the randing.

According to a second aspect of the invention there is provided a method of manufacturing a randed shoe sole in which a randed midsole is produced by this method and the randed midsole is then connected to an outer sole to form a randed sole.

According to a third aspect of the invention there is provided a randed shoe sole or midsole formed by the method summarised above.

Other features of the invention are set forth in the appended claims.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

- Figure 1** shows a diagrammatic cross-section of a mould used in a first version of the method of the invention;
- Figure 2** shows a perspective view of an integrally moulded, randed caster produced by the mould seen in Figure 1;
- Figure 3(a)** shows a cross-section at the line 3-3 in Figure 2 after an exact or flush trimming operation;

**Figure 3(b)** shows a cross-section at the line 3-3 in Figure 2 after a slight oversize trimming operation;

**Figure 3(c)** shows a cross-section at the line 3-3 in Figure 2 after an exact or flush trimming operation and the subsequent application of a indentation; and

**Figure 4** shows a diagrammatic cross-section of a mould including an insert to produce a relieved pattern on the underside of the sole.

#### **DESCRIPTION OF EMBODIMENTS**

Figure 1 diagrammatically illustrates an injection mould 10 which is used to produce an integrally moulded, randed caster. The mould cavity 12 of the mould is formed by upper and lower mould parts 10.1 and 10.2 respectively.

The upper mould part 10.1 is formed with a recessed channel 14 shaped as the negative of the randing which will be formed, as described below, in the moulding process. The lower mould part 10.2 is formed with a recessed zone or cavity 16 shaped as the negative of the caster which will be formed, as described below, in the moulding process. It will be noted that the external dimensions of the channel 14 are somewhat less than the external dimensions of the recessed zone 16.

In use, a suitable thermoplastics polymer is injected in molten form into the mould cavity 12 and allowed to set. Demoulding produces the integrally moulded article 18 seen in Figure 2. This article consists of an oversize sole caster 20 and randing 22 moulded integrally in one piece.

As shown in Figure 3(a), the superfluous or redundant outer zone 24 of the caster 20 is subsequently trimmed off such that the outer edge of the cast

is flush with the outer periphery of the randing. In the resulting, randed shoe sole, there will be no visible line at which the randing meets the sole.

In the alternative arrangement shown in Figure 3(b), the zone 24 is trimmed off to be very slightly oversize relative to the outer periphery of the randing thereby creating in the completed sole a visible shoulder 26 at which the randing meets the sole. This creates the visual impression that the randing and sole were formed as separate components subsequently connected to one another. This may in some cases be considered to be aesthetically preferable.

Yet another possibility is illustrated in Figure 3(c). The zone 24 is again trimmed off completely as in Figure 3(a). However in this case a visible indentation 27 is impressed into the side of the sole about the side thereof. This once again gives the visual impression that the randing and sole are separately formed components connected to one another.

The material which is trimmed off can be granulated and fed back into the injection moulding machine for use in subsequent moulding operations. There is accordingly no wastage of material.

The randing 22 follows the predetermined contour required for a specific shoe size. The caster 20 is substantially oversize with respect to the shoe size. Thus it will be understood that the same size caster can be used for a range of different shoe sizes. To produce soles for different shoe sizes, the same mould part 10.2 can be used with only the upper mould part 10.1 being changed for different sizes.

This is considered to a major advantage of the invention in that the reduced number of mould parts will considerably reduce overall production costs and there will be less mould part changing operations. In practice it is envisaged that a small number of different lower mould parts 10.2 could be used for a greater number of shoe sizes. There may for example be one mould part 10.2 for shoe sizes 4 to 8 and another mould part 10.2 for shoe

sizes 9 to 13. Also, although Figure 2 shows the caster 20 to have the general shape of a shoe sole, this is by no means necessary. The caster could have a rectangular, oval or any other oversize shape.

The integrally moulded, randed caster seen in Figure 2 does not include a heel, i.e. is heelless. It will be understood that a separately manufactured heel will subsequently be affixed to the underside of the sole by conventional means.

In the embodiment described above, a sole of full thickness is produced. It is also within the scope of the invention to produce a midsole of reduced thickness, as indicated by the broken line 28 in Figure 3(a). The randed midsole which is produced can be connected subsequently, for example by adhesive, to an outer sole in the creation of the final sole. It would also be possible, with the addition of a suitable colourant, to produce a randed midsole having a different colour from that of the outer sole. This may be considered aesthetically pleasing.

It will also be understood that in the illustrated embodiment in which the base of the recess or cavity 16 is smooth, the oversize sole caster 20, and hence the sole which is eventually produced, will also be smooth. In some cases it may be desired to provide a relief pattern on the underside of the sole to improve the grip of the sole or for aesthetic reasons. In such cases, the base of the cavity 16 may have a relief pattern which is the negative of the sole pattern which it is desired to produce. Alternatively, as shown in Figure 4, a removable insert in the form of a mould plate 30 carrying the desired negative pattern on its upper surface can be placed in the cavity 16, prior to moulding, to produce the sole pattern which is required. It will be understood that different mould plates can be used with the same mould part 10.2 to produce different patterns.

As another alternative, the smooth underside of the sole can be treated by conventional means to have a bovinide or leather-look appearance, or bunking may be applied to the underside.

In cases where a thinner sole or midsole is required, a sole plate 30 with either a smooth or patterned upper surface can be supported at a higher elevation in the cavity 16 by means of shims or spacers located in the cavity beneath it.

It will be understood that, while in the embodiments described above, the randing 22 has a simple rectangular cross-section, in practice, the mould recess 14 may be shaped to produce randing with a wide range of fancier cross-sections.

In the above description a suitable thermoplastic material is injection moulded to produce the one-piece moulding consisting of the caster and randing. It will be understood that if a multi-cavity mould is used the moulding which is produced could provide a caster with integral randing for multiple soles or midsoles, the individual soles or midsoles then being trimmed from the moulding.

In other embodiments, the one piece article could be produced by moulding a resin rubber rather than by injection. Moulding in this case would be achieved by hot pressing a sheet of the resin rubber to produce a vulcanised, unitary article consisting of the oversize caster with integral randing. This operation could simultaneously produce a caster with integral randing for multiple soles or midsoles, possibly to suit the same or different shoe sizes, with the individual soles or midsoles subsequently being trimmed from the moulding.

**CLAIMS**

1.

A method of manufacturing a randed shoe sole or midsole wherein a one piece article comprising a heelless sole or midsole caster with randing thereon is produced by a single moulding step, the caster being oversize relative to the randing, and the caster is then trimmed to suit the randing.

2.

A method according to claim wherein the one piece article is formed of a thermoplastic material by injection moulding.

3.

A method according to claim 2 wherein material trimmed from the caster is re-used in further injection moulding operations.

4.

A method according to either one of claims 2 or 3 wherein the single moulding step is carried out in a mould having a first mould component including a caster recess in which the oversize caster is formed and a second mould component mateable with the first component and including a recess in which the randing is formed, the recesses communicating with one another to form, when the components are mated with one another, a continuous mould cavity in which both the caster and the randing are moulded simultaneously.

5.

A method according to claim 4 and including the step of locating a removable mould insert in the caster recess prior to the single moulding step, the mould insert carrying the negative of a relief pattern which it is desired to produce on an underside of the caster.



6.

A method according to claim 1 wherein the one piece article is formed by hot pressing a resin rubber material.

7.

A method according to any one of the preceding claims wherein the caster is trimmed flush with the randing.

8.

A method according to claim 7 and including the step, after trimming the caster, of forming an indentation extending about the side of the sole or midsole, to create the visual impression that the caster and randing were formed separately from one another and subsequently connected to one another.

9.

A method according to any one of claims 1 to 6 wherein the caster is trimmed to be slightly oversize relative to the randing, thereby creating a shoulder extending about the side of the sole or midsole to create the visual impression that the caster and randing were formed separately from one another and subsequently connected to one another.

10.

A method of manufacturing a randed shoe sole in which a randed midsole is produced by a method according to any one of the preceding claims and the randed midsole is then connected to an outer sole to form a randed sole.

11.

A method according to claim 10 wherein the randed midsole is connected to an outer sole of different colour to the midsole.

12.

A randed shoe sole or midsole formed by a method according to any one of claims 1 to 8.

13.

A randed shoe sole formed by a method according to claim 9 or claim 10.

14.

A method of manufacturing a randed shoe sole or midsole, substantially as herein described with reference to Figures 1 and 2 or Figure 4 read with any one of Figures 3(a) to 3(c) of the accompanying drawings.

